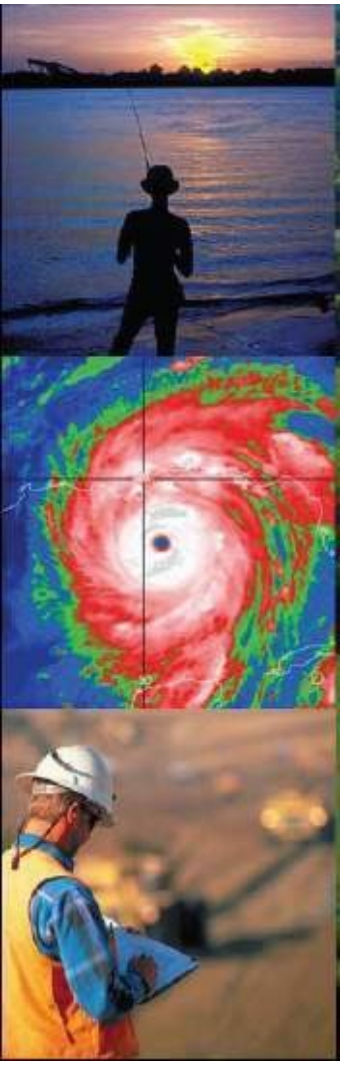


Louisiana Coastal Protection and Restoration (LACPR)

Presentation to

Netherlands Ministry of Transportation, Public Works, and Water Management (Rijkswaterstaat)

LACPR US-Dutch Collaboration
The Hague, The Netherlands
10-11 October 2006

One Team: Communicating, Collaborating, Consensus

Purpose of Briefing

- Present new approach to Risk-Informed Planning (RIP)

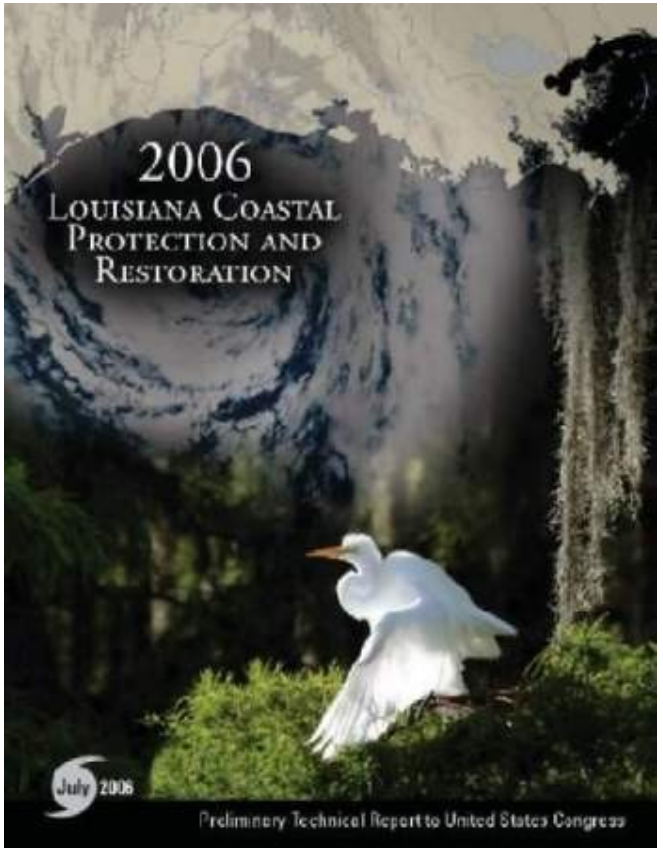
- Solicit feedback on:
  - RIP Process
  - Objectives and Metrics
  - Beyond analysis:
    - Making difficult decision tradeoffs
    - Adaptive management

Congressional Direction

- Comprehensive hurricane protection analysis and design
- Full range of flood control, coastal restoration, and hurricane protection measures
- Storm surge equivalent to a “Category 5” hurricane
- Exclusive of normal policy considerations
- Preliminary Technical Report within 6 months
- Final technical report within 24 months
- Reports on component areas for authorization as soon as practicable
- Close coordination with the State of Louisiana

Preliminary Technical Report

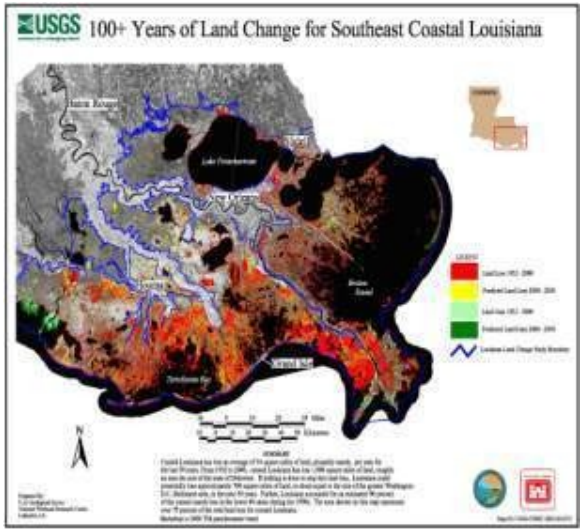
- Report completed in July 2006
- Characterizes hurricane threat and engineering design challenges
- Multiple lines of defense strategy
  - Coastal restoration/protection
  - Structural measures
  - Non-structural features
- Describes need for using risk reduction decision framework
- Describes plan to produce Final Technical Report



Importance of Coastal Louisiana to the Nation

- Louisiana is a “working coast"
  - Strategic energy production and delivery corridor
  - Waterborne commerce gateway to the world
  - Vibrant commercial fisheries production grounds
  - Coastal ecosystem with diverse fish and wildlife
- Coastal restoration is integral to hurricane protection of Louisiana’s “working coast”
- Unaddressed risk to coastal Louisiana equates to risk of disrupted goods and services t Nation

Planning and Design Challenges

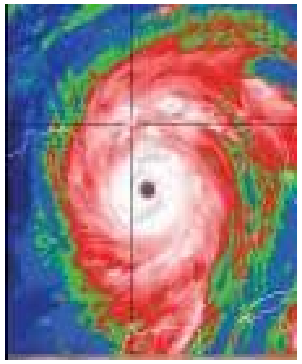


Coastal landscape change

Community recovery timelines

Difficult engineering conditions

Interconnected systems

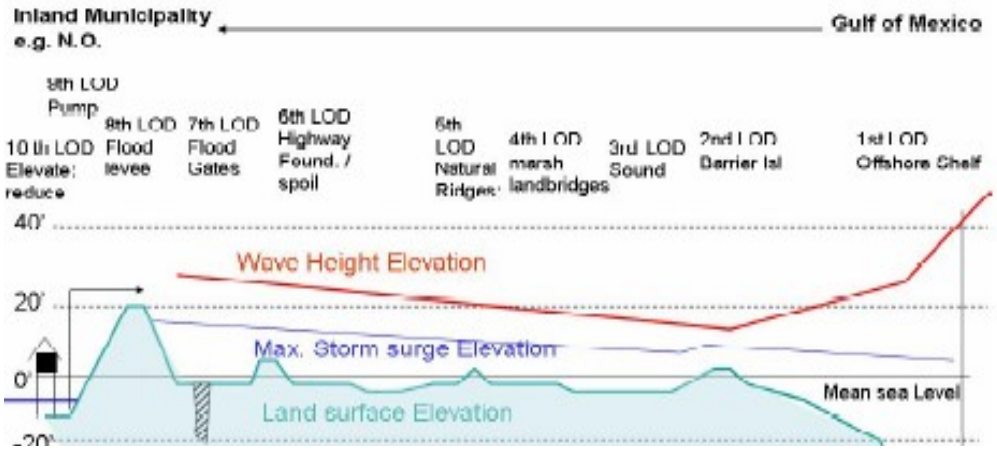


Battling nature's most powerful storms

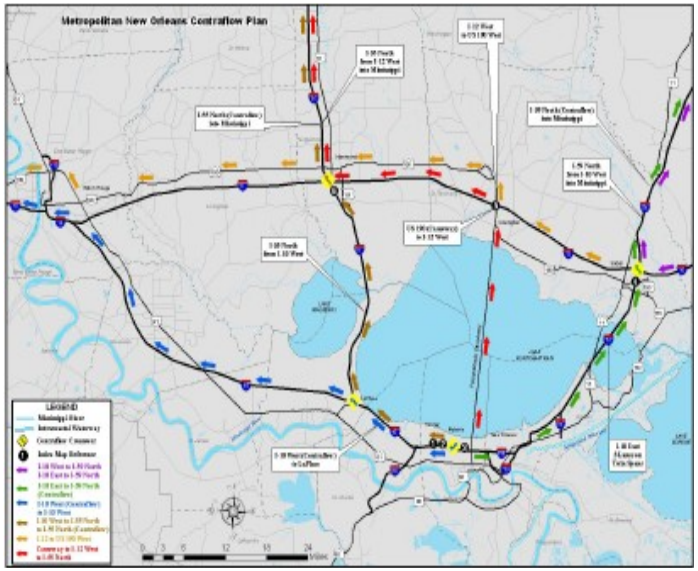
Innovative technologies

Flood and Storm Damage Risk Reduction Strategies

Community recovery and redevelopment plans



Coastal lines of defense



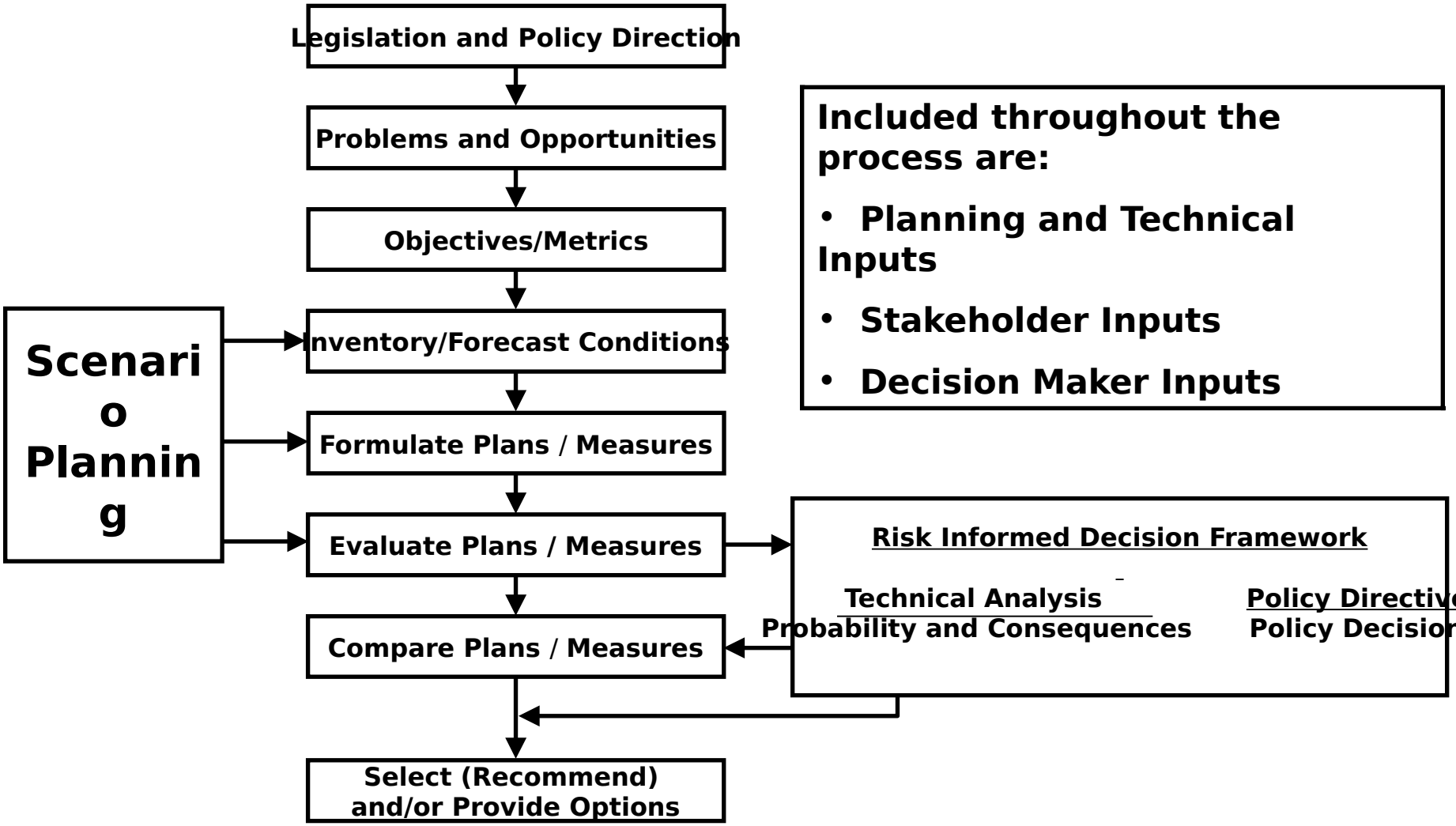
Evacuation plans

Structural storm surge barriers

Coordinated Planning Efforts

- State of Louisiana
  - Coastal Protection and Restoration Authority Master Plan
  - Louisiana Recovery Authority Community Redevelopment Planning
- Multi-discipline – broad organizational teams
  - State and Federal agencies
  - Academia
  - Dutch Rijkswaterstaat, other nations worldwide
- Strong public involvement
  - Workshops
  - Public scoping
  - Stakeholder forums
- Quality Reviews
  - Independent Technical Review
  - External Peer Review

Risk-Informed Planning



Federal Objectives and Metrics

Objective	Metric	Units
Reduce risk to public health and safety from catastrophic storm inundation	Population at risk Evacuation success Reduction of residual risk	% exposed % evacuated
Reduce damages from catastrophic storm inundation	Single Event Storm damages reduced Other economic impacts Reduction of residual risk Strategic significance	$ Y/N
Promote a sustainable ecosystem	Resiliency / sustainability	High, medium, low
Restore / sustain diverse fish and wildlife habitats	Habitat suitability Coastal land gain/loss	HSUs Acres by type
Sustain working coast heritage, history, and cultures	Proportion of historic sites protected OSE factors	%

Scenario Planning

- Major uncertainty “drivers”
  - Local sea-level rise and land subsidence
  - Redevelopment
    - Rates
    - Residential/Commercial/Industrial
    - Local zoning and flood plain management
  - Relative storm frequency and intensity
- Multiple “futures” based on all combinations
- Assess plans against all “futures”
- No probabilities assigned

Quantitative Uncertainties

- Variables to which probability can be assigned
- Variables having reasonably well-established uncertainty bands
- Key examples
  - Property values
  - Elevation
  - Inundation frequencies and stage
  - Rates of land loss
  - Population at risk

Sensitivity Analysis

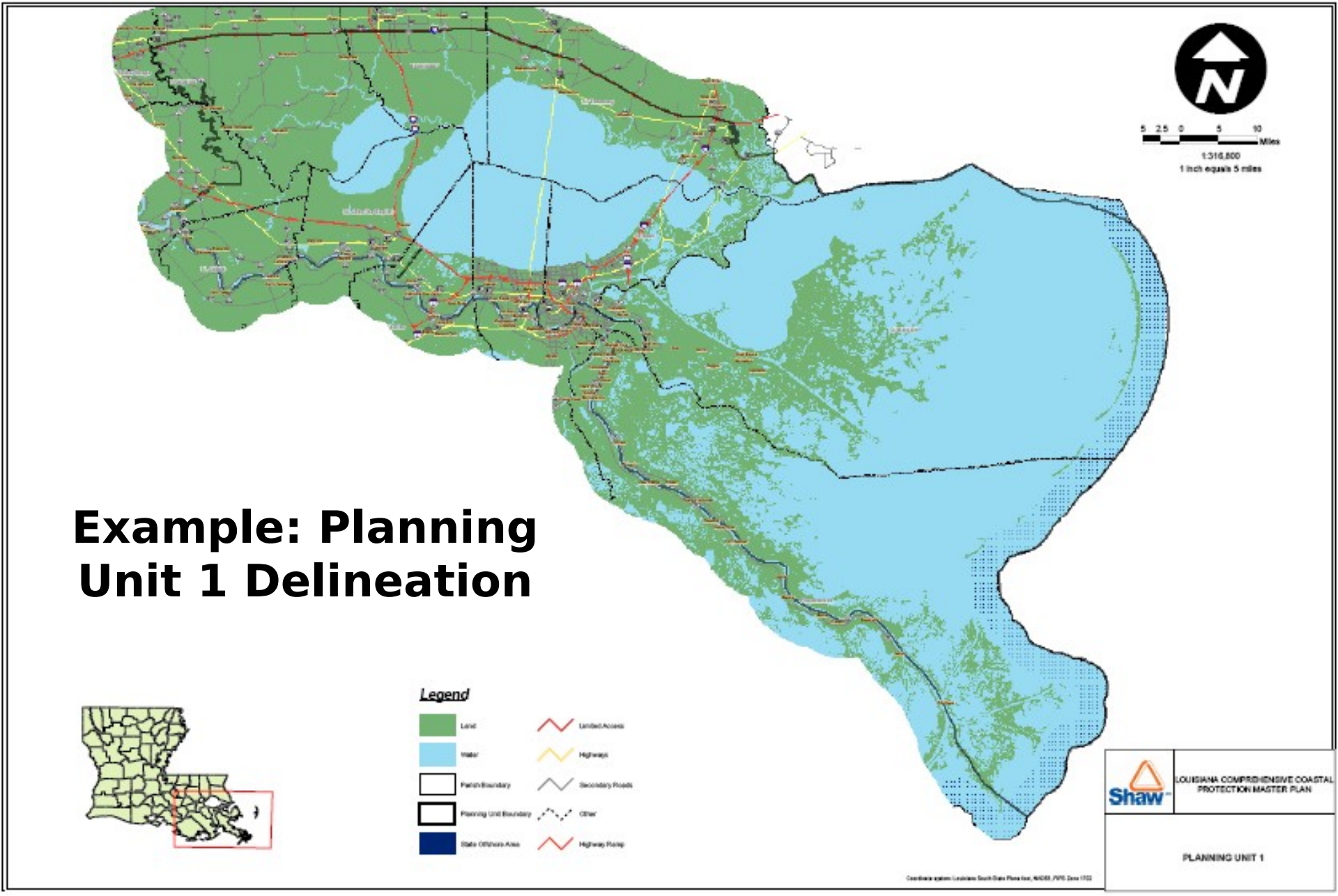
- Variables with moderately to weakly established uncertainty bands

- Examples
  - Sediment availability
  - Evacuation effectiveness
  - Project performance
    - Large scale coastal restoration
    - Structural measures
    - Non-structural measures

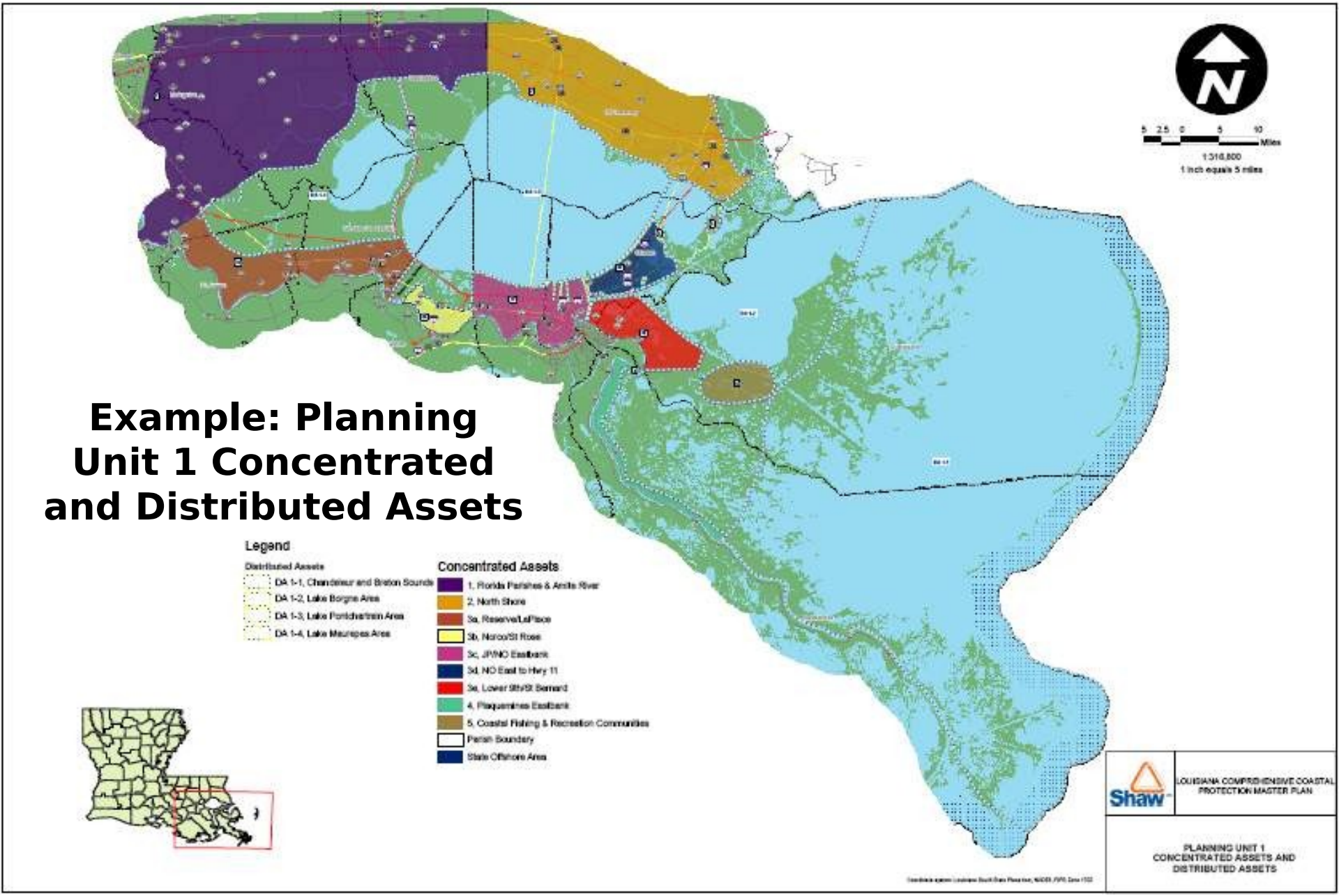
Planning Units*

* Further divided into sub-units for better resolution as investigation progresses

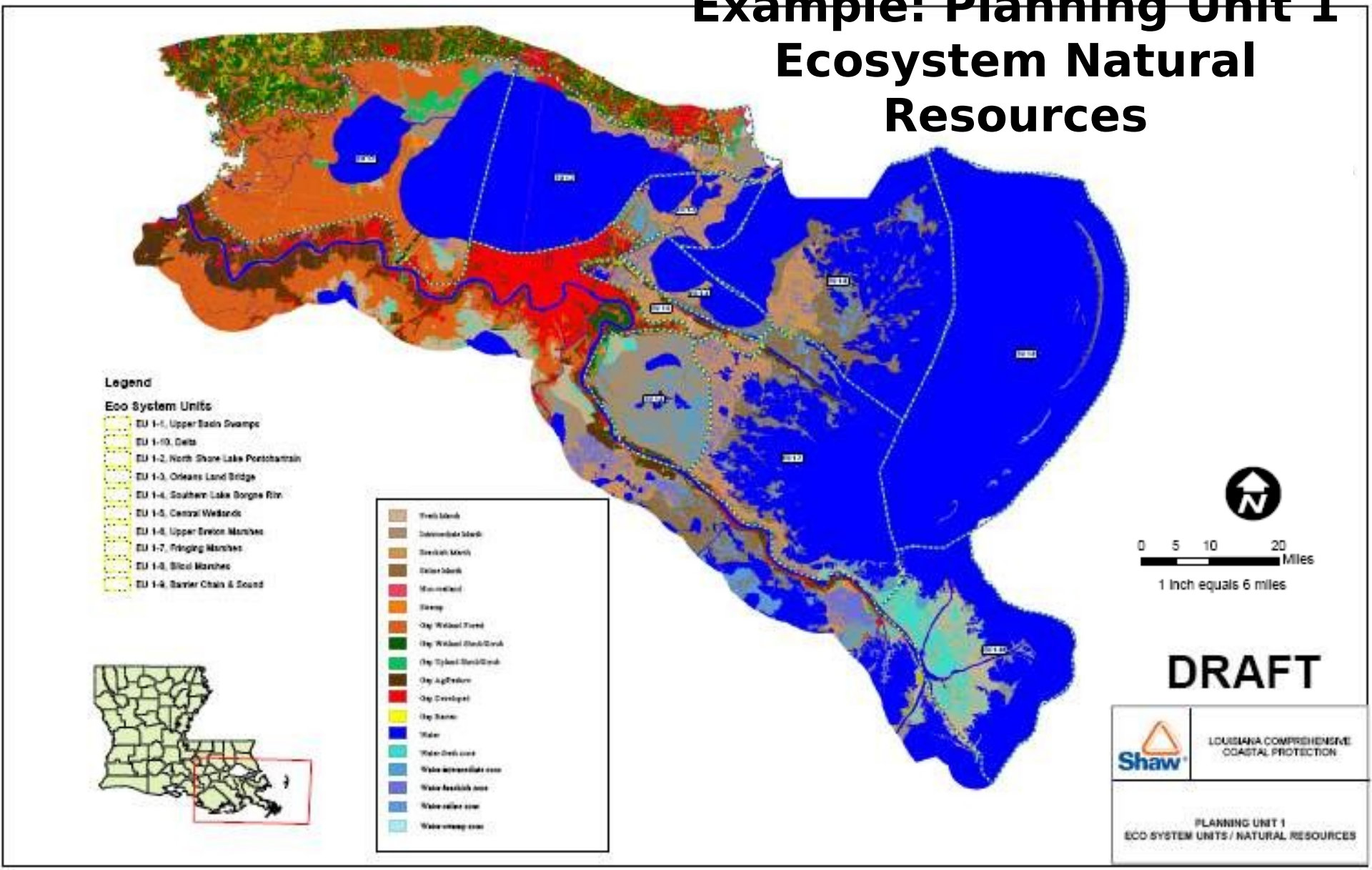
Example: Planning Unit 1 Delineation



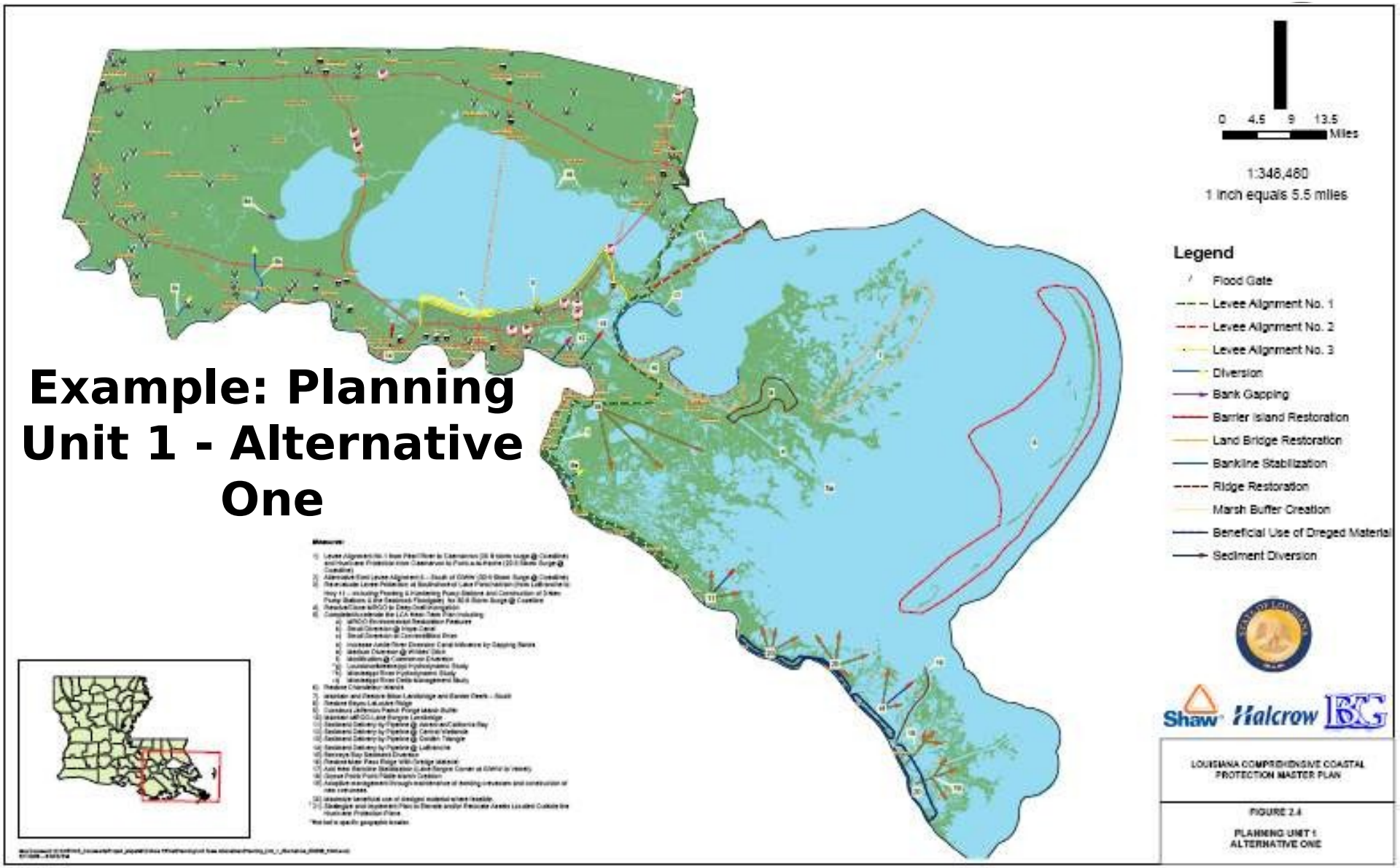
Example: Planning Unit 1 Concentrated and Distributed Assets



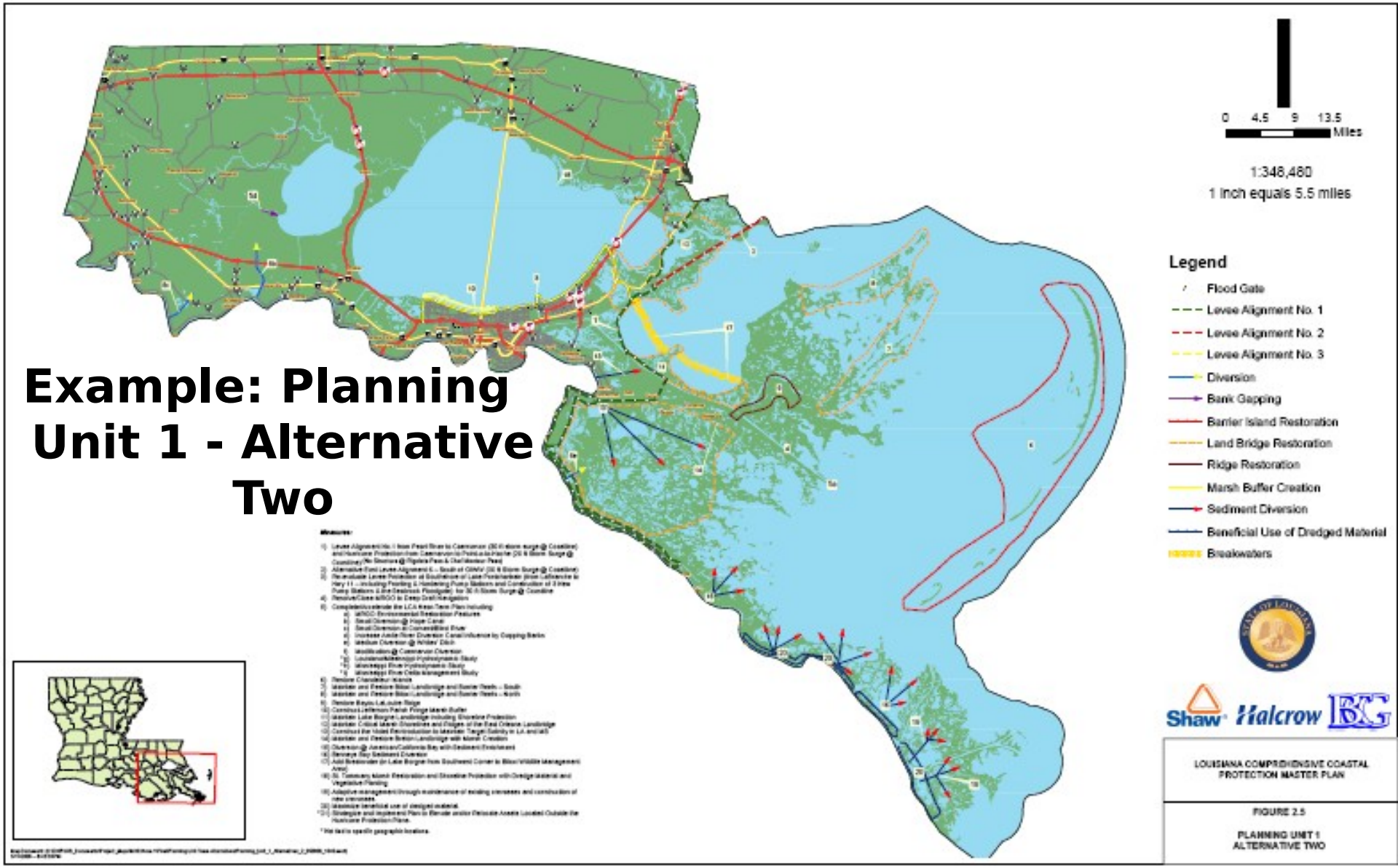
Example: Planning Unit 1 Ecosystem Natural Resources



Example: Planning Unit 1 - Alternative One



Example: Planning Unit 1 - Alternative Two



Evaluation of Plans / Measures

Scenario Combination X, Planning Unit Y

Plan	Metric 1	Metric 2	Metric 3	Metric n
w/o project	Performance against metric	Performance against metric	Performance against metric	Performance against metric
Alt. 1	Performance against metric	Performance against metric	Performance against	Performance against metric
Alt. 2	Performance against metric	Performa against metric		mance st
Alt. 3	Performance against metric	Perform against metric		mance ainst metric
Alt. n	Performance against metric	Performance against metric	Performance against metric	Performance against metric

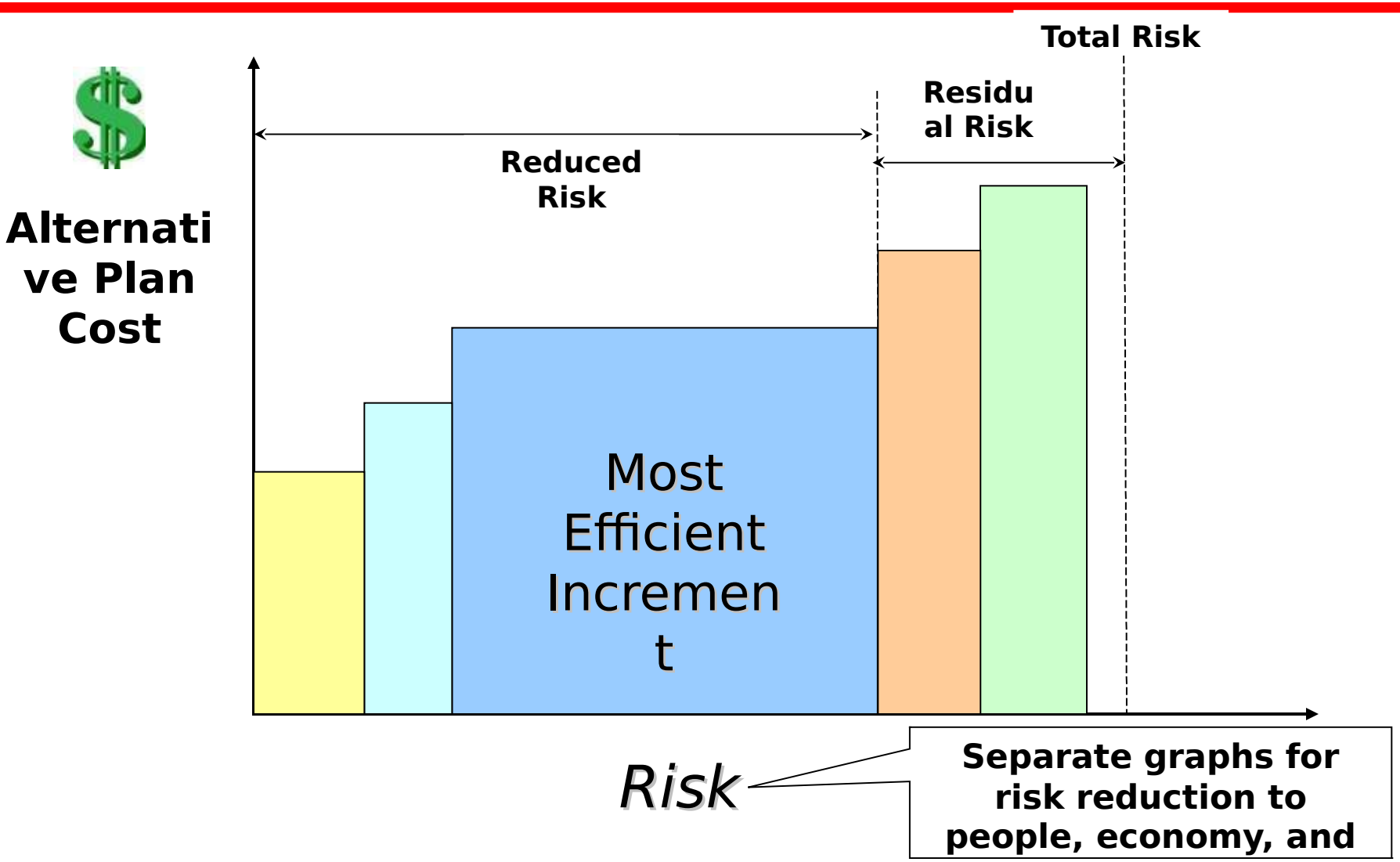
- **Combine measures to improve performance**
- **Screen poorly performing plans**

Comparison of Plans / Measures

Planning Unit Y

Scenario / Metric	Scenario Combination 1	Scenario Combination 2	Scenario Combination 3
Metric 1	**Alt. 1**	**Alt. 2**	**Alt. 3**
Metric 2	**Alt. 1**	**Alt. 2**	**Alt. 3**
Metric 3	**Alt. 1**	**Alt. 3**	**Alt. 4**
Metric 4	**Alt. 2**	**Alt. 3**	**Alt. 5**
Metric n	**Alt. 2**	**Alt. 4**	**Alt. 5**

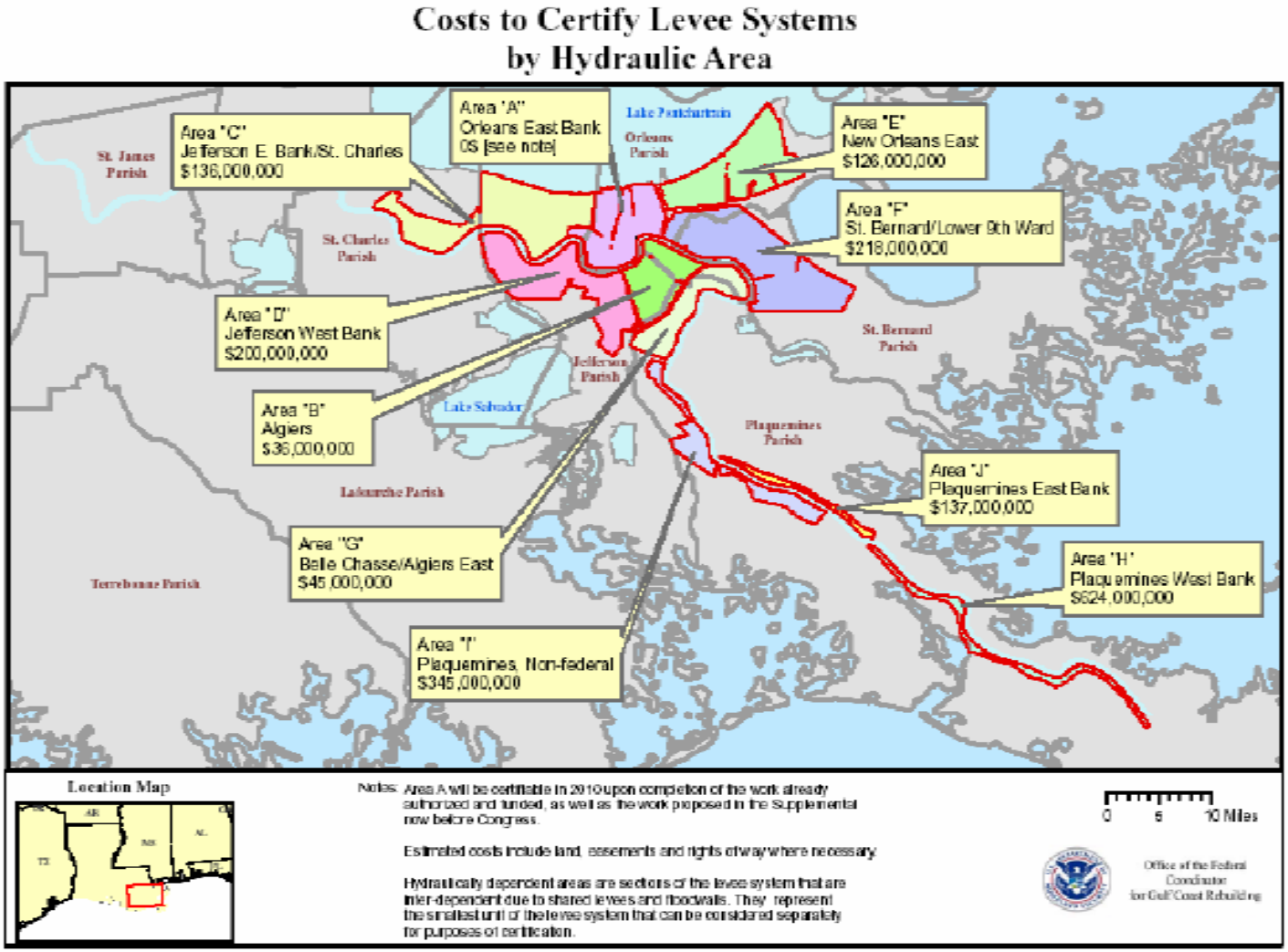
Example Risk Display



Communicating Risk

- Maps showing areas with reduced risk under various scenario/plan combinations
- Maps showing areas remaining at risk under various scenario/plan combinations
- Comparisons with and without project for a given event such as a Katrina-like storm
- Content / format consistent with that provided by FEMA, USGS, NOAA

Example of Risk Communication



One Team: Communicating, Collaborating, Consensus

Decision Making Criteria: Characteristics of a Desirable Plan

- Residual risk
- Robustness
- Reliability
- Adaptability
- Acceptability
- Timeliness
- Cost
- Certainty
- Sustainability
- Completeness
- Separablility
- System Integration

Final Technical Report (FTR) Development Objectives / Major Milestones

- Develop State Master Plan alternatives .....7 AUG 06 – 15 NOV 06
- Develop Risk-Informed Planning Framework (RIP) .....10 AUG 06 – 6 OCT 06
- Prepare RIP model and inputs for further analyses.....10 AUG 06 – 15 NOV 06
- Identify high priority risk reduction/restoration features through RIP.....15 NOV 06 – 31 JAN 07
- Conduct NEPA / continued planning on initially analyzed alternatives.....1 FEB 07 – 1 OCT 07
- Develop FTR and Draft PEIS for upward submittal.....15 NOV 06 – 1 OCT 07
- FTR and Final PEIS upward submittal.....1 OCT 07 – 31 DEC 07

Questions / Issues for Discussion

- What are views on rigor, effectiveness, and practicality to implement the RIP process as currently developed in timeframe required? Might there be valuable simplifications?
- What metrics and units would best quantify an objective to “sustain coastal Louisianaians living and working in wetlands who are producing regional and national economic outputs that cannot be achieved anywhere else in any other way”.
- Beyond planning, how do nations worldwide handle deeply conflicting but vitally important features, such as need to manage rivers and coasts for coastal restoration and protection while sustaining important navigation activities?
- How should adaptive management be implemented in RIP development and application for project planning, design, construction, operation, and maintenance, so that decision makers are comfortable with making the investment in the beginning?

Additional Information

Project Web Page

http://lacpr.usace.army.mil/